

DIVISION 10

Section 3110F - MECHANICAL AND ELECTRICAL EQUIPMENT

3110F.1 General. This Section provides the minimum standards for mechanical and electrical equipment at MOTs.

See subsection 3101F.3 for definitions of “new” (N) and “existing” (E).

3110F.2 Marine Loading Arms.

3110F.2.1 General Criteria. Marine loading arms and ancillary systems shall conform to 2 CCR 2380 (b) [10.1], 33 CFR 154.510 [10.2] and the “Design and Construction Specification for Marine Loading Arms,” [10.3].

The following shall be considered when determining the loading arm maximum allowable extension limits:

1. Vessel sizes and manifold locations
2. Lowest-low water level (Datum)
3. Highest-high water level
4. Maximum vessel surge and sway
5. Maximum width of fendering system

3110F.2.2 Electrical and Hydraulic Power Systems

3110F.2.2.1 Pressure and Control Systems (N).

1. Pressure gauges shall be mounted in accordance with ASME B40.100-1998 [10.4].
2. The hydraulic drive cylinders shall be mounted and meet either the mounting requirements of ANSI/(NFPA) T3.6.7 R2-1996 [10.5] or equivalent.
3. In high velocity current (> 1.5 knots) areas, all new marine loading arms shall be fitted with quick disconnect couplers and emergency quick release systems in conformance with Section 6.0 and 7.0 of [10.3]. In complying with this requirement, attention shall be paid to the commentary and guidelines in Part III of reference [10.3].
4. Out-of-limit, balance and the approach of out-of-limit alarms shall be located at or near the loading arm console.

3110F.2.2.2 Electrical Components (N). The following criteria shall be implemented:

1. Equipment shall be provided with a safety disconnecting device to isolate the entire electrical system from the electrical mains in

accordance with Article 430 of the National Electric Code (NEC), [10.6].

2. Motor controllers and 3-pole motor overload protection shall be installed and sized in accordance with Article 430, NEC [10.6].
3. Control circuits shall be limited to 120 volts and shall comply with Articles 500 and 501 of the NEC [10.6]. Alternatively, intrinsically safe wiring and controls may be provided in accordance with Article 504, NEC [10.6] and ANSI/UL Std. No. 913 [10.7].
4. Grounding and bonding shall comply with the requirements of Article 430, NEC [10.6] and Section 3111F.

Section 3111F includes requirements for electrical equipment, wiring, cables, controls and electrical auxiliaries located in hazardous areas.

3110F.2.2.3 Remote Operation. The remote control system, where provided, shall conform to the recommendations of the OCIMF [10.3]. The remote operation shall be facilitated by either a pendant control system or by a hand-held radio controller (N).

The pendant control system shall be equipped with a plug-in capability to an active connector located either in the vicinity of the loading arms, or at the loading arm outboard end on the triple swivel, and hard-wired into the control console. The umbilical cord running from the triple swivel to the control console shall be attached to the loading arm. Other umbilical cords shall have sufficient length to reach the maximum operational limits (N).

The radio controller if installed shall comply with 2 CCR 2370(e) [10.8] and 47 CFR Part 15 [10.9] requirements for transmitters operating in an industrial environment (N/E).

3110F.3 Oil Transfer Hoses (N/E). Hoses for oil transfer service shall be in compliance with 2 CCR 2380 (a) [10.10] and 33 CFR 154.500 [10.11]

Hoses with diameters of 6 inches or larger shall have flanges that meet ANSI B16.5 [10.12]. Hoses with diameters of 4 inches or less may have quick disconnect fittings provided that they meet ASTM F-1122 [10.13].

3110F.4 Lifting Equipment: Winches And Cranes. Lifting equipment shall conform to [10.14], [10.15], [10.16] and [10.17]. Electrical equipment shall conform to the provisions of Section 3111F.

3110F.4.1 Winches.

1. Winches and ancillary equipment shall be suitable for a marine environment (N/E).
2. Winches shall be provided with a fail-safe braking system, capable of holding the load under all conditions, including a power failure (N/E).
3. Winches shall be fully reversible (N)
4. Shock, transient, and abnormal loads shall be considered when selecting winch systems (N).
5. Winches shall have limit switches and automatic trip devices to prevent over-travel of the drum in either direction. Limit switches shall be tested, and demonstrated to function correctly under operating conditions without inducing undue tensions or slack in the winch cables (N/E).
6. Under all operating conditions, there shall be at least two full turns of cable on grooved drums, and at least three full turns on ungrooved drums (N/E).
7. Moving winch parts which present caught-in hazards to personnel shall be guarded (N/E).
8. Winches shall have clearly identifiable and readily accessible stop controls (N/E).

3110F.4.2 Cranes (N/E).

1. Cranes shall not be loaded in excess of the manufacturer's rating except during performance tests.
2. Drums on load-hoisting equipment shall be equipped with positive holding devices.
3. Under all operating conditions, there shall be at least two full turns of cable on grooved drums, and at least three full turns on ungrooved drums .
4. Braking equipment shall be capable of stopping, lowering, and holding a load of at least the full test load.
5. When not in use, crane booms shall be lowered to ground level or secured to a rest support against displacement by wind loads or other outside forces.
6. Safety systems including devices that affect the safe lifting and handling, such as interlocks, limit switches, load/moment and overload indicators with shutdown capability, emergency stop switches, radius and locking indicators, shall be provided [10.18].

3110F.5 Shore-To-Vessel Access for Personnel.

This subsection applies to shore-to-vessel means of access for personnel and equipment provided by the terminal. This includes ancillary structures and equipment, which support, supplement, deploy and maneuver such vessel access systems.

Shore-to-vessel access for personnel shall conform to 29 CFR 1915.74 [10.19], Sections 19(b) and 21(b) of [10.20] and the following:

1. Shore-to-vessel access systems shall be designed to withstand the forces from dead, live, wind, vibration, impact loads, and the appropriate combination of these loads. The design shall consider all the critical positions of the system in the stored, maintenance, maneuvering, and deployed positions, where applicable (N).
2. The minimum live load shall be 50 psf on walkways and 25 plf with a 200 pounds minimum concentrated load in any location or direction on handrails (N).
3. The walkway shall be not less than 36 inches in width (N) and not less than 20 inches for existing walkways (E).
4. The shore-to-vessel access system shall be positioned so as to not interfere with the safe passage or evacuation of personnel (N/E).
5. Guardrails shall be provided on both sides of the access systems with a clearance between the inner most surfaces of the guardrails of not less than 36 inches and shall be maintained the full length of the walkway (N).
6. Guardrails shall be at a height not less than 33 inches above the walkway surface and shall include an intermediate rail located midway between the walkway surface and the top rail (N/E).
7. The walkway surface, including self-leveling treads, if so equipped, shall be finished with a safe non-slip footing accommodating all operating gangway inclinations [10.21](N/E).
8. Under no circumstances shall the operating inclination of the walkway exceed 60 degrees from the horizontal or the maximum angle recommended by the manufacturer, whichever is less (N/E).
9. The undersides of aluminum gangways shall be protected with hard plastic or wooden strips to prevent being dragged or rubbed across any steel deck or component (N/E).

3110F.6 Sumps, Discharge Containment and Ancillary Equipment.

Sumps, discharge containment and ancillary equipment shall conform to 2 CCR 2380(f) [10.22], 33 CFR 154.530 [10.23] and the following:

1. Sumps for oil drainage shall be equipped with pressure/vacuum vents, automatic draining pumps and shall be tightly covered (N/E).
2. Sumps which provide drainage for more than one berth should be equipped with liquid seals so that a fire on one berth does not spread via the sump (N/E).

3. Sumps shall be located at least 25 ft. from the manifolds, base of the loading arms or hose towers (N).
4. Conduct periodic integrity testing of the sump containers and periodic integrity and leak testing of the related valves and piping.

3110F.7 Vapor Control Systems. Vapor control systems shall conform to 33 CFR 154.800 through 154.850 [10.24] and API Standard 2610 [10.25]. The effects of seismic, wind, dead, live and other loads shall be considered in the analysis and design of individual tie-downs of components, such as of steel skirts, vessels, controls and detonation arresters. The analysis and design shall include the load transfer to supporting deck/pile structures or foundation elements.

3110F.8 Equipment Anchors and Supports. For new (N) electrical and mechanical equipment, the seismic lateral loads (demand) shall be calculated using the methods of Section 6.2 of FEMA 368 [10.26]. The design for load transfer to the wharf deck shall use the same procedures as for mooring and berthing components (see subsection 3107F.4.3).

For existing (E) equipment, the seismic assessment shall be performed in accordance with CalARP [10.27], FEMA 356 [10.28] or ASCE Guidelines [10.29].

3110F.9 References.

- [10.1] 2 CCR 2380(b), Title 2, California Code of Regulations, Section 2380(b), Loading Arms.
- [10.2] 33 CFR 154.510, Title 33 Code of Federal Regulations Section 154.510.
- [10.3] Oil Companies International Marine Forum (OCIMF), 1999, "Design and Construction Specification for Marine Loading Arms," 3rd ed., Witherby, London.
- [10.4] American Society of Mechanical Engineers (ASME), 2000, ASME B40.100-1998, "Pressure Gauges and Gauge Attachments," New York.
- [10.5] National Fluid Power Association (NFPA), 1996, ANSI/(NFPA) T3.6.7 R2-1996, "Fluid Power Systems and Products – Square Head Industrial Cylinders – Mounting Dimensions," Milwaukee, WI.
- [10.6] National Fire Protection Association, 2002, NFPA 70, "National Electric Code," Quincy, MA.
- [10.7] Underwriters Laboratory, Inc., 1997, "Intrinsically Safe Apparatus and Associated

Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations," ANSI/UL Standard No. 913, 5th ed., Northbrook, IL.

- [10.8] 2 CCR 2370(e), Title 2 California Code of Regulations, Section 2370(e).
- [10.9] 47 CFR Part 15 Private Land Mobile Radio Services, Title 47 Code of Federal Regulations (CFR).
- [10.10] 2 CCR 2380(a), Title 2, California Code of Regulations, Section 2380(a).
- [10.11] 33 CFR 154.500 Hose Assemblies, Title 33 Code of Federal Regulations Section 155.500.
- [10.12] American Society of Mechanical Engineers, 1996, ASME/ANSI B16.5, "Pipe Flanges and Flanged Fittings," New York.
- [10.13] American Society for Testing and Materials, 2001, ASTM F-1122-87 (1998), "Standard Specification for Quick Disconnect Couplings," West Conshohocken, PA.
- [10.14] 29 CFR 1918, Subpart F, Title 29 Code of Federal Regulations Section 1918, Subpart F.
- [10.15] American Society of Mechanical Engineers, 1996, ASME B30.4 - 1996, "Portal Tower and Pedestal Cranes," New York.
- [10.16] American Society of Mechanical Engineers, 2002, ASME B30.7 - 2001, "Base Mounted Drum Hoists," New York.
- [10.17] American Society of Mechanical Engineers, 1999, ASME HST-4, "Performance Standard for Overhead Electric Wire-Rope Hoists," New York.
- [10.18] 29 CFR 1917.46, Title 29 Code of Federal Regulations Section 1917.46 Load Indicating Devices.
- [10.19] 29 CFR 1015.74, Title 29 Code of Federal Regulations Section 1015.74, Access to Vessels.
- [10.20] US Army Corps of Engineers, 1996, "Safety and Health Requirements Manual, Sections 19(b) and 21(b)," EM 385-1-1, Washington, D.C.
- [10.21] 29 CFR 1918.22, Title 29 Code of Federal Regulations Section 1918.22.

- [10.22] 2 CCR 2380 (f), Title 2, California Code of Regulations, Section 2380 (f), Small Discharge Containment.
- [10.23] 33 CFR 154.530, Title 33, Code of Federal Regulations, Section 154.530 Small Discharge Containment.
- [10.24] 33 CFR 154.800 through 154.850, Title 33 Code of federal Regulations, Sections 154.800 through 154.850.
- [10.25] American Petroleum Institute (API), 1994, API Standard 2610, "Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities," ANSI/API STD 2610-1994, 1st ed., Washington, D.C.
- [10.26] Federal Emergency Management Agency, 2001, FEMA 368, "NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures", Part 1 – Provisions, Washington D.C.
- [10.27] CalARP Program Seismic Guidance Committee, 1998, "Guidance for California Accidental Release Prevention (CalARP) Program Seismic Assessments," Sacramento, CA.
- [10.28] Federal Emergency Management Agency, Nov. 2000, FEMA 356, "Prestandard and Commentary for the Seismic Rehabilitation of Buildings", Washington, D.C.
- [10.29] American Society of Civil Engineers, 1997, "Guidelines for Seismic Evaluation and Design of Petrochemical Facilities," New York, NY.

Authority: Sections 8755 and 8757, Public Resources Code.

Reference: Sections 8750, 8751, 8755 and 8757, Public Resources Code.